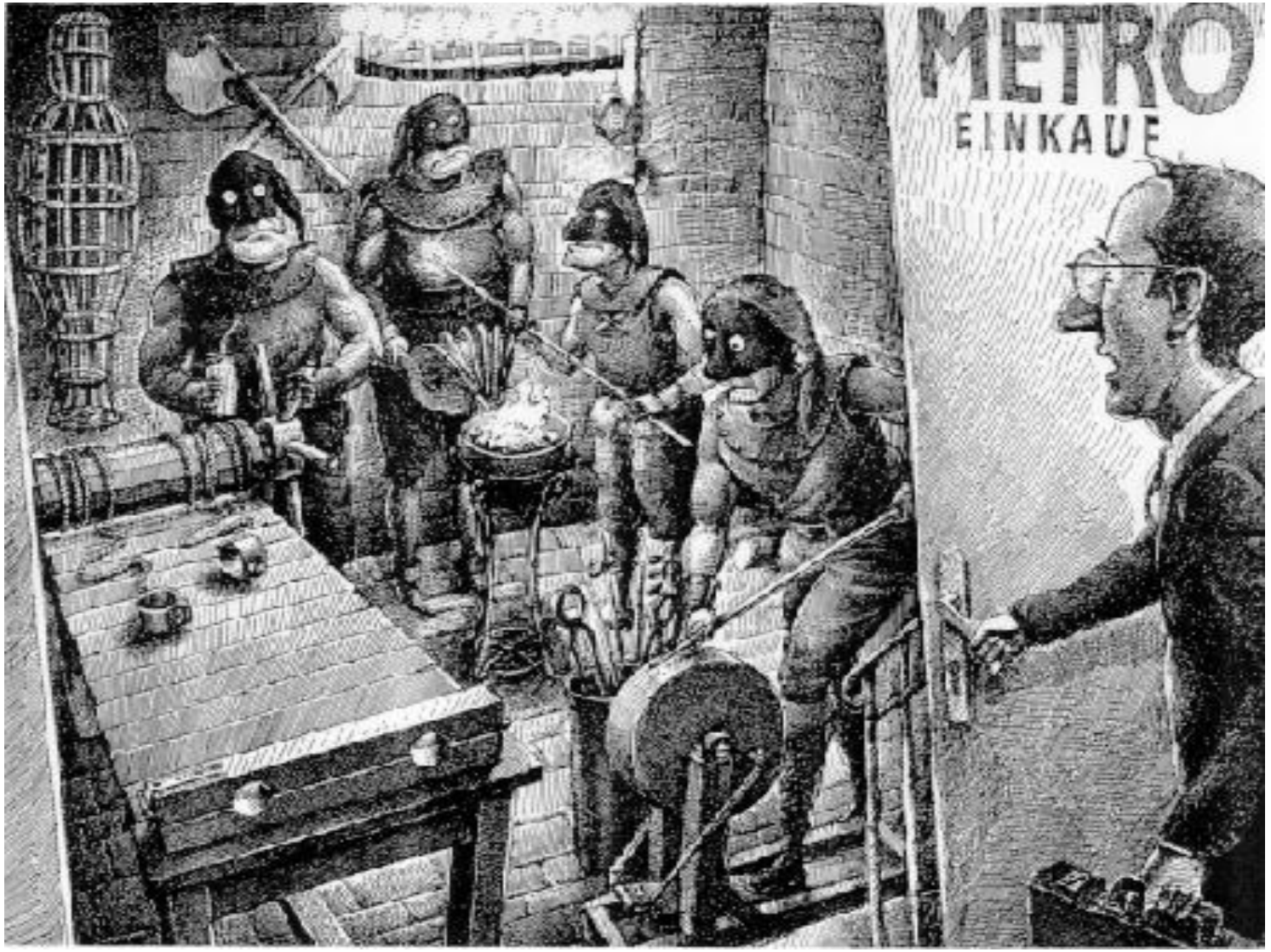
Collaborative Logistics – Myth and Realities -

ECR Italy

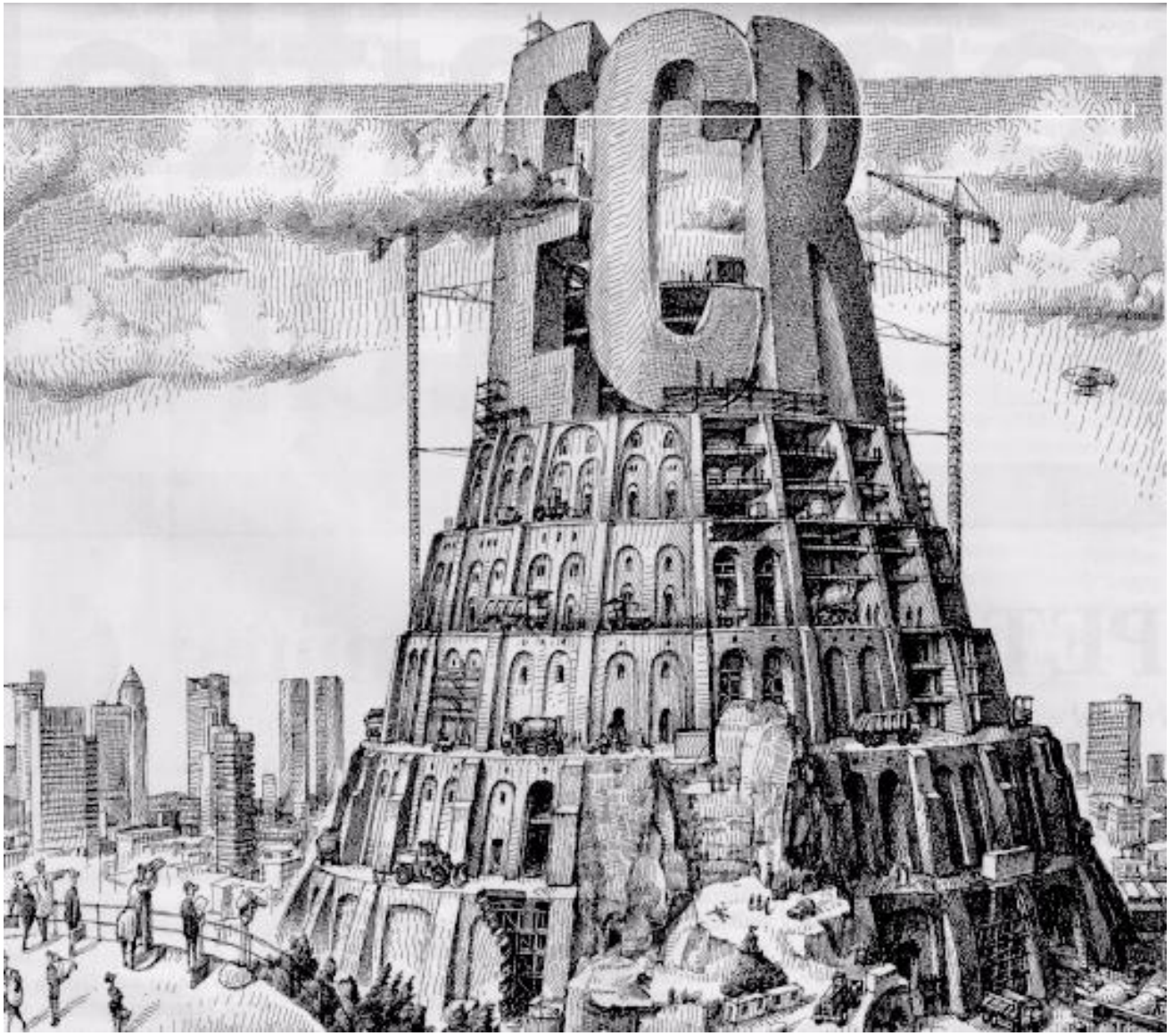
Prof. Daniel Corsten

January 28, 2015

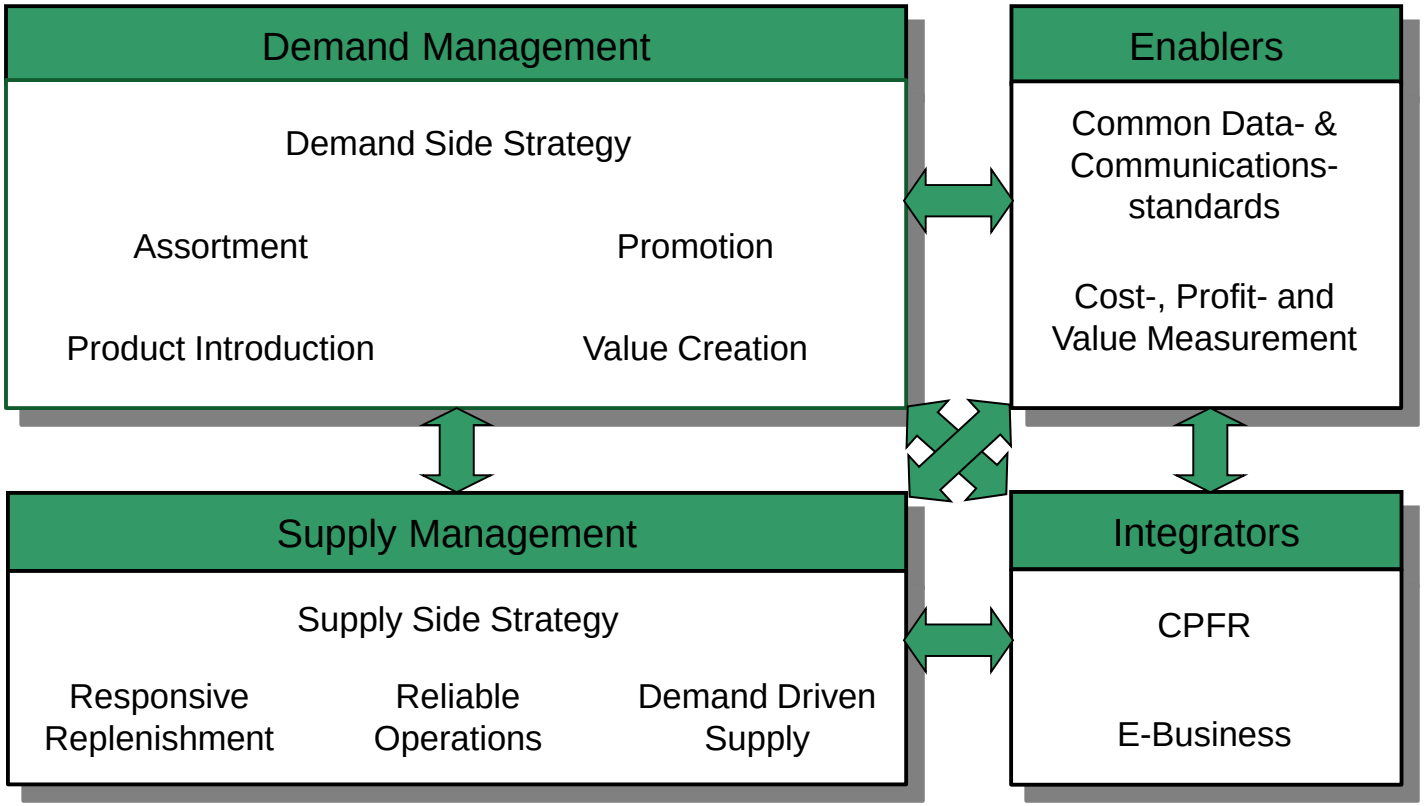
Transactional Retailer-Supplier Relationships used to be the norm …



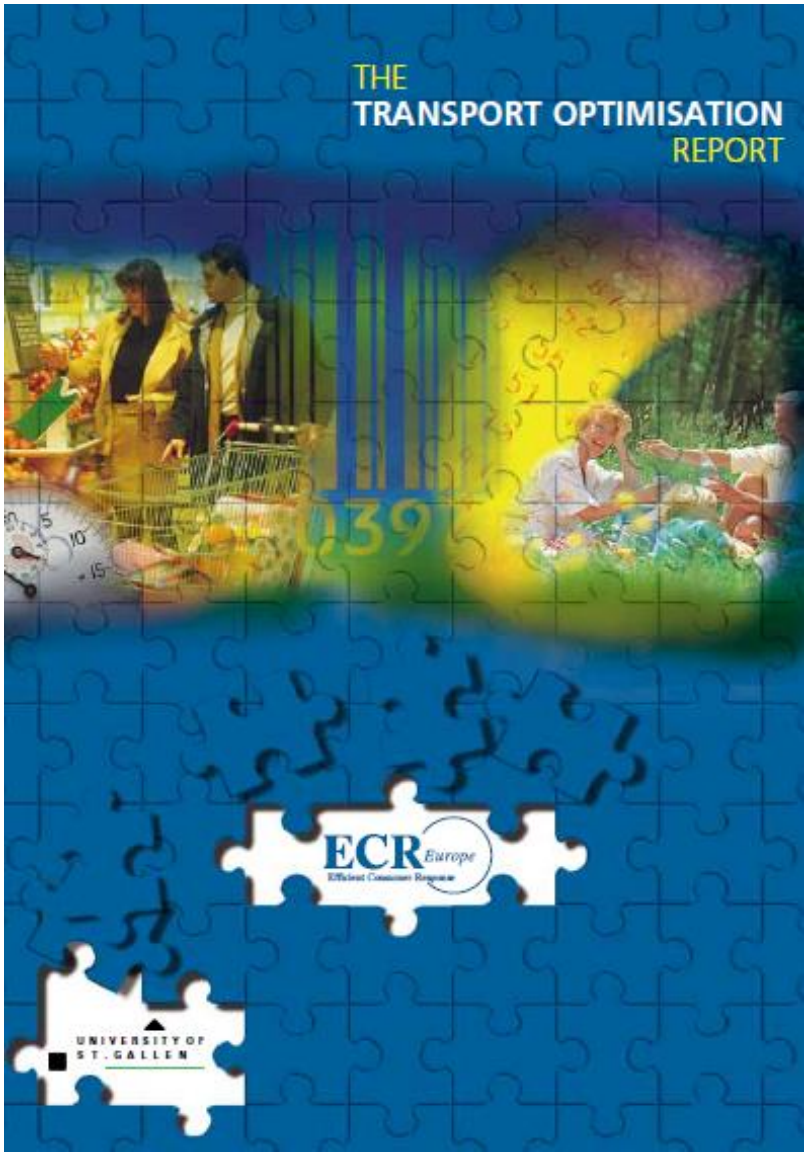
.. but ECR changed it: „Working together to fulfil consumer wishes better, faster and at less cost“



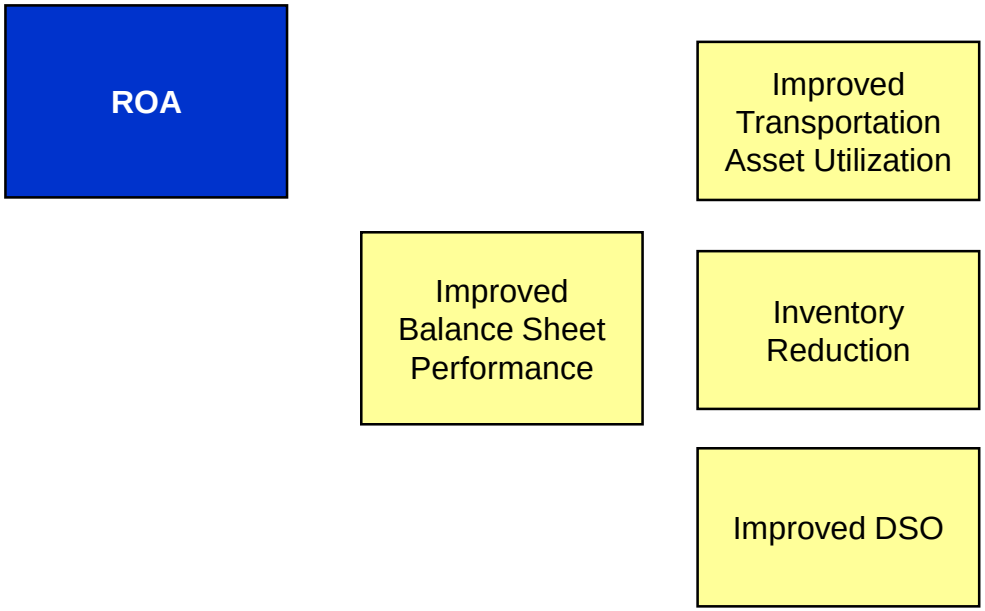
ECR Europe promoted Collaboration across the areas of the Global Scorecard



.. but the ECR Transport Optimisation Report did not even mention Collaborative Logistics …



A Return-on-Asset View shows great benefits for Collaborative Logistics

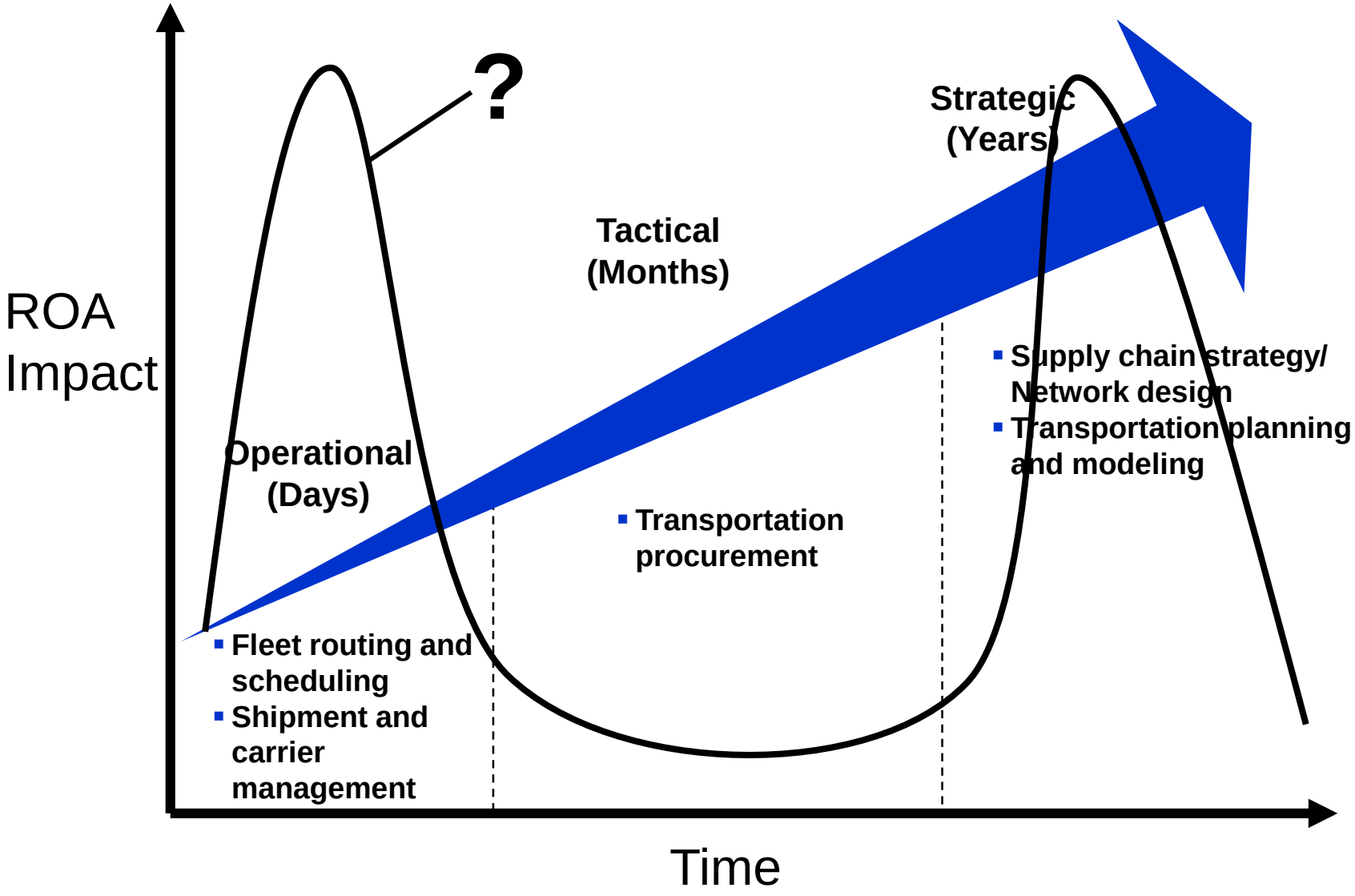


Comments

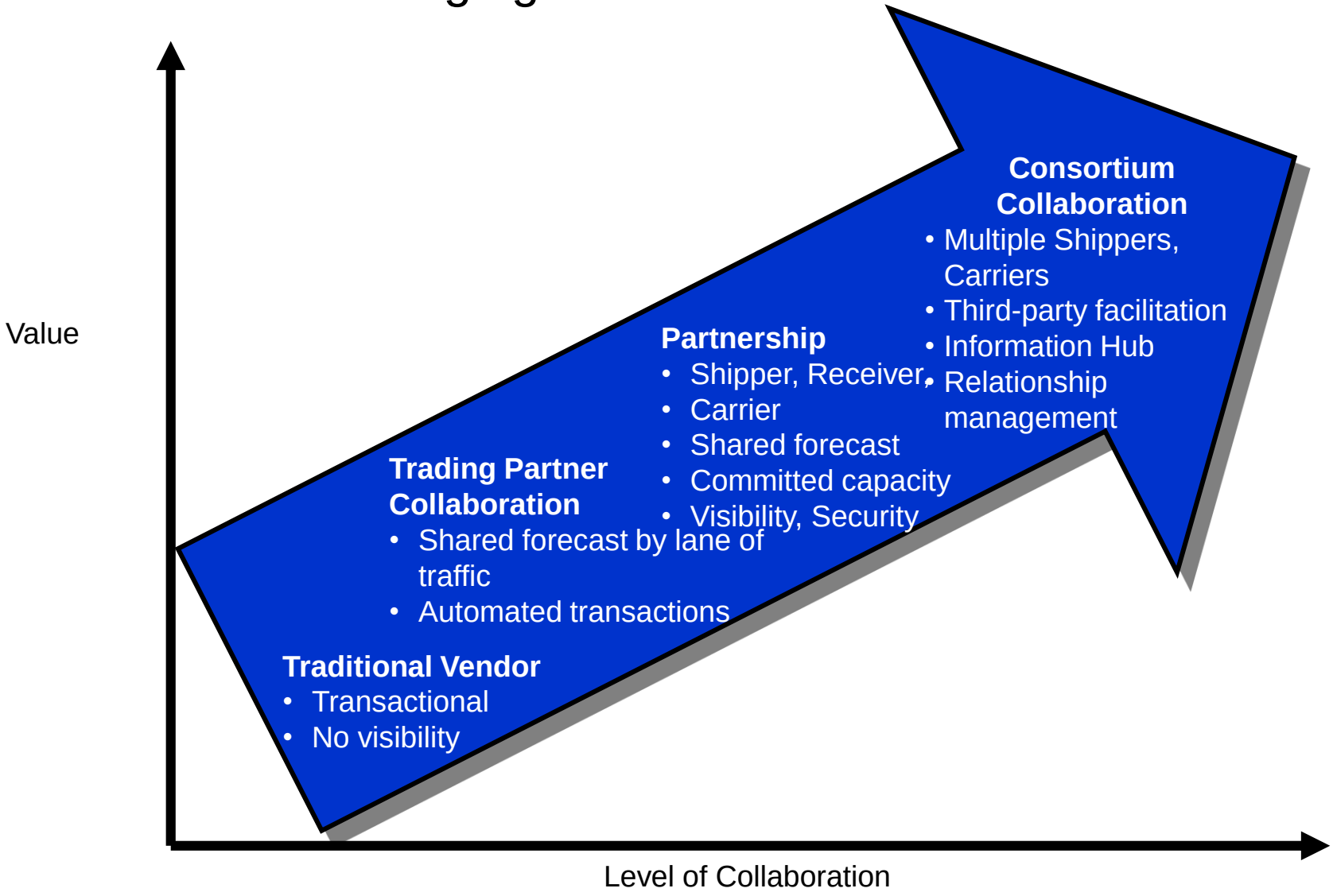
- CL enables improved service levels and on-shelf availability across the board
- Shippers and carriers with CL capabilities become "go-to" parties for major retailer events
- Opportunities exist to minimize/eliminate costs associated with miscommunications across the extended supply chain, e.g.:
- Collaboration facilitates better use of transportation and warehousing assets for all participants, e.g.:
- The ability for participants to take a system-wide view of supply and demand minimizes unnecessary inventory
- Better communication between partners creates the opportunity to reduce DSO

J. Sutherland, Lehigh University

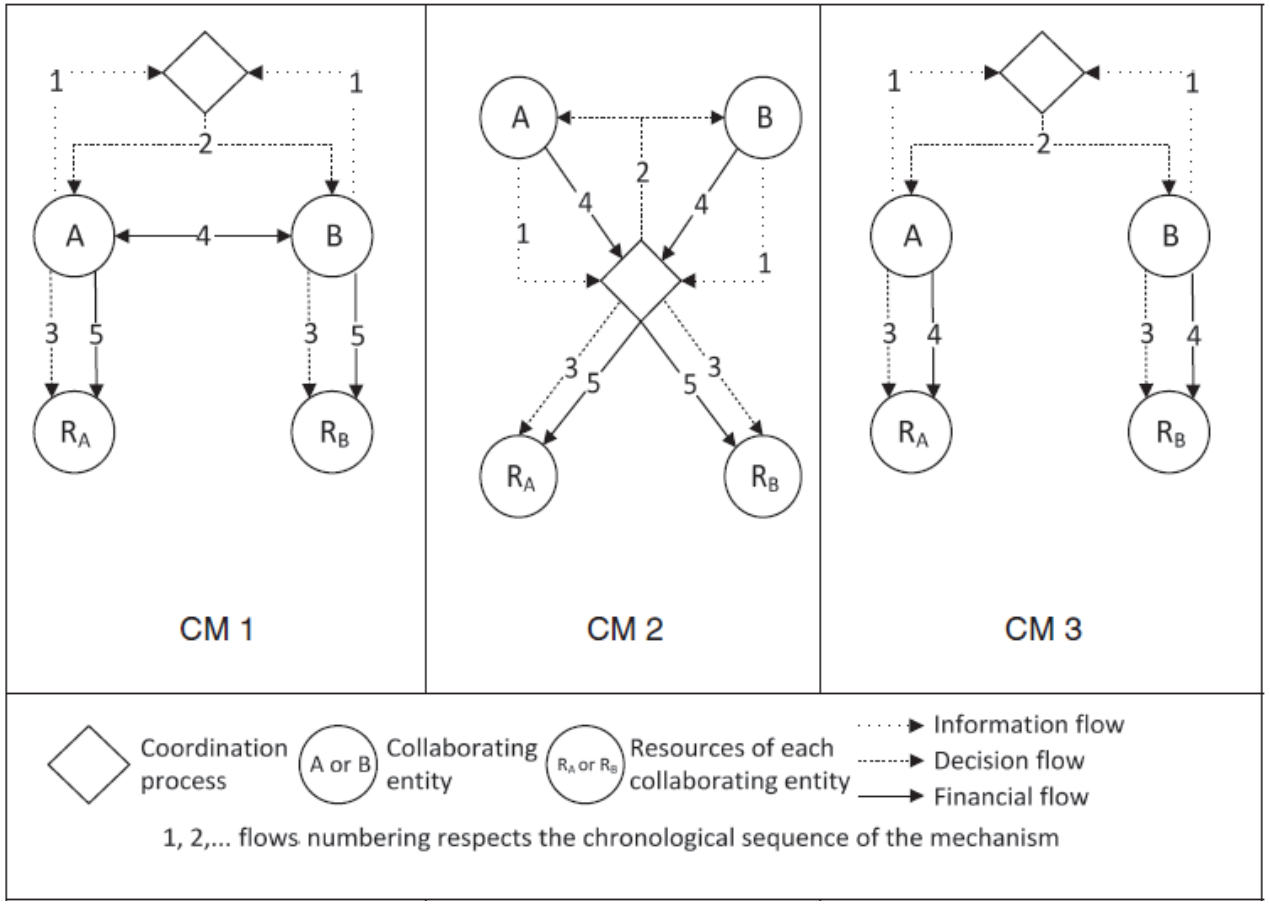
The Benefits of Collaborative Logistics increase With time …..



… and the level of Collaboration. But coordination is challenging!

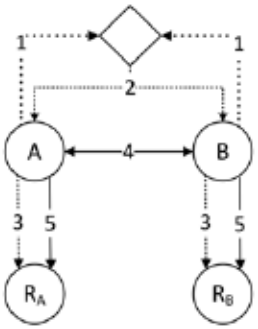


New research describes different mechanisms to coordinate Collaborative Logistics

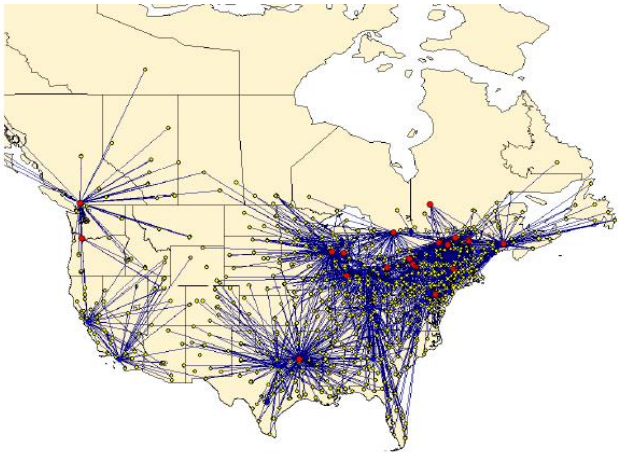


J-F Audy, S D'Amoursa & M. Rönnqvist (2012, 2013)

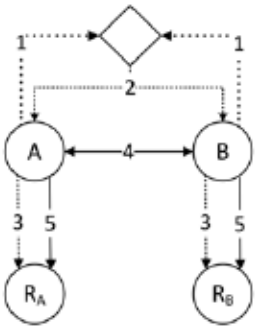
Coordination Type I



- Coordination process solves an optimization problem in order to achieve maximum savings
- Benefit sharing is addressed with a financial flow between the business units based on a predefined incentive rule such as pricing agreements or quantity discounts.
- This type of CM is useful to change the behavior of the partners and better coordinate their planning decisions, especially when partners are not ready to totally change their way of doing business

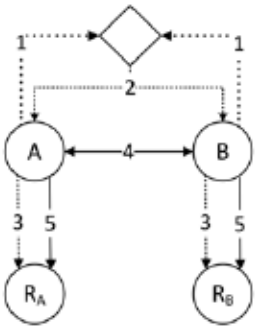


Case: Pulp and Paper Producer and Wholesaler (1)

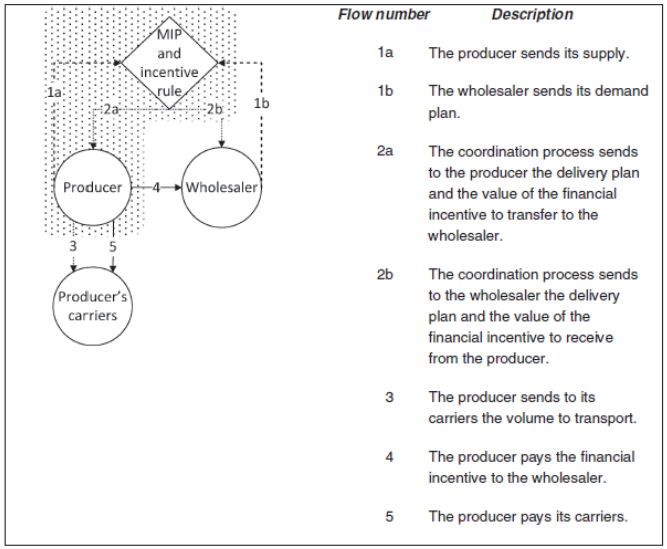


- Vertical collaboration with limited production capacity and multiple customers
- The producer planned operations in order to minimize the (local) production, distribution, and inventory costs, while the wholesaler ordered products so as to minimize the (local) buying, ordering, and inventory costs. Global costs of the system were ignored.
- A change in the wholesaler order generally had a significant impact on the production and distribution systems of the producer (small lot sizes that may not be produced or delivered economically).
- Objective was to identify the collaborative approach to implement to ensure an efficient exchange of products and information as well as maximum benefits for the network and for each partner.

Case: Pulp and Paper Producer and Wholesaler (2)

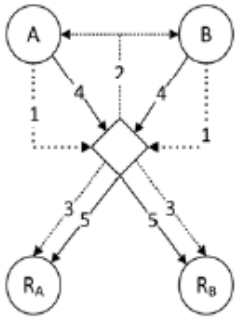


- The analysis revealed that CPFR generated the greatest profit for the producer, while traditional CR was the most beneficial for the wholesaler.
- The experiments showed that if the producer shared a part of the transportation savings with the wholesaler, the profit of the wholesaler was higher than the profit obtained with CR and the producer obtained a higher profit than that generated by the other approaches.



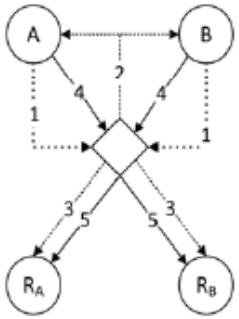
Flow number	*Description*
1a	The producer sends its supply.
1b	The wholesaler sends its demand plan.
2a	The coordination process sends to the producer the delivery plan and the value of the financial incentive to transfer to the wholesaler.
2b	The coordination process sends to the wholesaler the delivery plan and the value of the financial incentive to receive from the producer.
3	The producer sends to its carriers the volume to transport.
4	The producer pays the financial incentive to the wholesaler.
5	The producer pays its carriers.

Coordination Type II



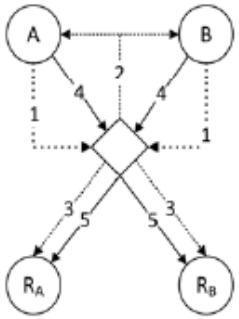
- Coordination process solves an optimization problem in order to achieve maximum savings
- Benefit sharing is addressed with a sharing principle based on an economic model (i.e. total cost allocation method)
- Cooperative game theory provides a set of desirable properties (e.g., efficiency) and equilibrium concepts (e.g., core) to define, respectively, fairness and stability.
- Consequently, each partner knows the global cost for all the logistics activities involved in the collaboration, without knowing the individual cost allocated to each one.

Outbound Furniture Transportation (1)

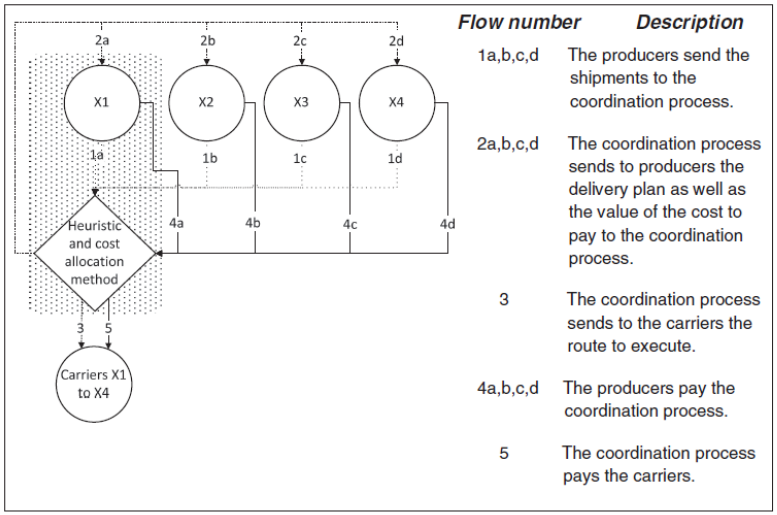


- The second case study refers to the potential collaboration in Canada.
- Objective was to optimize collectively the outbound transportation of four furniture manufacturers of to the US.
- Substantial system benefits were identified but the individual evaluation led to a situation where the scenario with the highest cost-savings for the group (optimal cost-savings scenario) did not provide the individual highest cost-savings to some companies, or worse, provided one or more negative benefits.

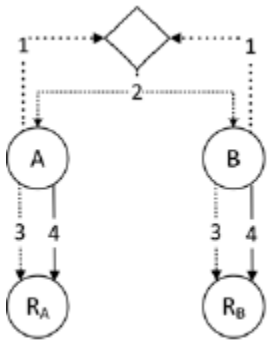
Outbound Furniture Transportation (2)



- By satisfying the individual requests the cost reductions went from 21.0% to 12.9%. In other words, an additional cost of 8.1% was incurred in the collaborative plan to satisfy the heterogeneous requirements of some partners.
- The “alternative cost avoided method” allowed sharing according to the impact of the requirements of each partner on the cost of the collaborative plan.
- The Equal Profit Method (EPM) was used to determine the individual cost-savings of each company.

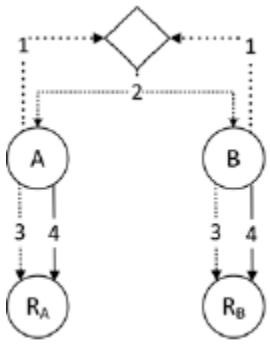


Coordination Type III



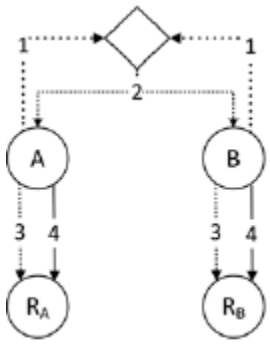
- Coordination process solves an optimization problem in order to achieve maximum savings, with respect to an additional constraint related to the benefit sharing.
- Because two entities are involved two plans are needed.
- Due to the absence of financial flows the cost of the plan of each business unit must be, at least, less than the cost of their stand-alone plan.
- Therefore, the new constraint states that each pair of companies must have the same relative savings following the Equal Profit Method (EPM)

Wood Supply Collaboration (1)

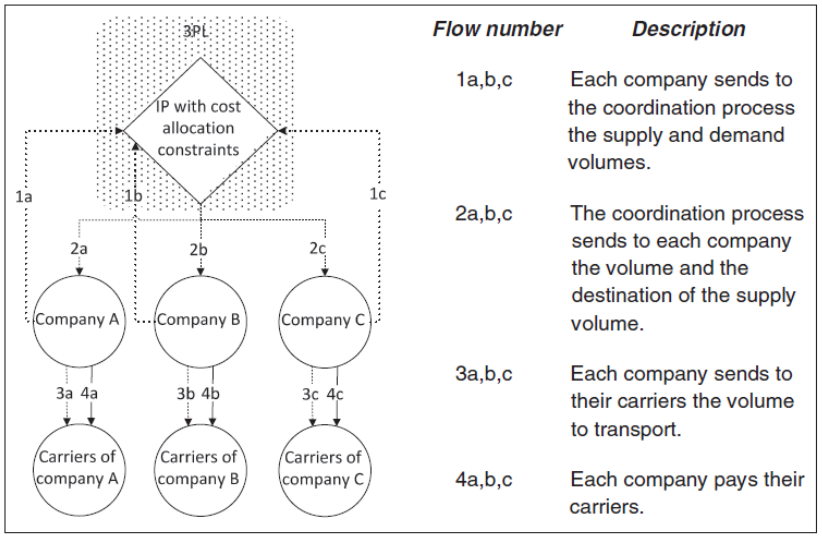


- Eight Swedish forest companies involved in transportation of logs from forest harvest areas to industries such as saw, pulp, and paper mills.
- Transportation cost often amounts to about a third of the raw material cost.
- Wood bartering (or timber exchange) between forest companies to reduce the transport cost is fairly common. Two companies agree to deliver a specific volume to the other company's demand points without the need to exchange information about their own savings

Wood Supply Collaboration (2)



- The optimization revealed potential savings of 14.2%.
- Benefit sharing according to share of the overall volume was discarded because relative savings ranged from 0.2 to 20% and this difference was too high.
- A relative Equal Profit Sharing mechanism was developed and accepted.
- A two-stage process was established where first volumes were identified that make a contribution to the collaboration, then the EPM was applied to these identified volumes.



Flow number	*Description*
1a,b,c	Each company sends to the coordination process the supply and demand volumes.
2a,b,c	The coordination process sends to each company the volume and the destination of the supply volume.
3a,b,c	Each company sends to their carriers the volume to transport.
4a,b,c	Each company pays their carriers.

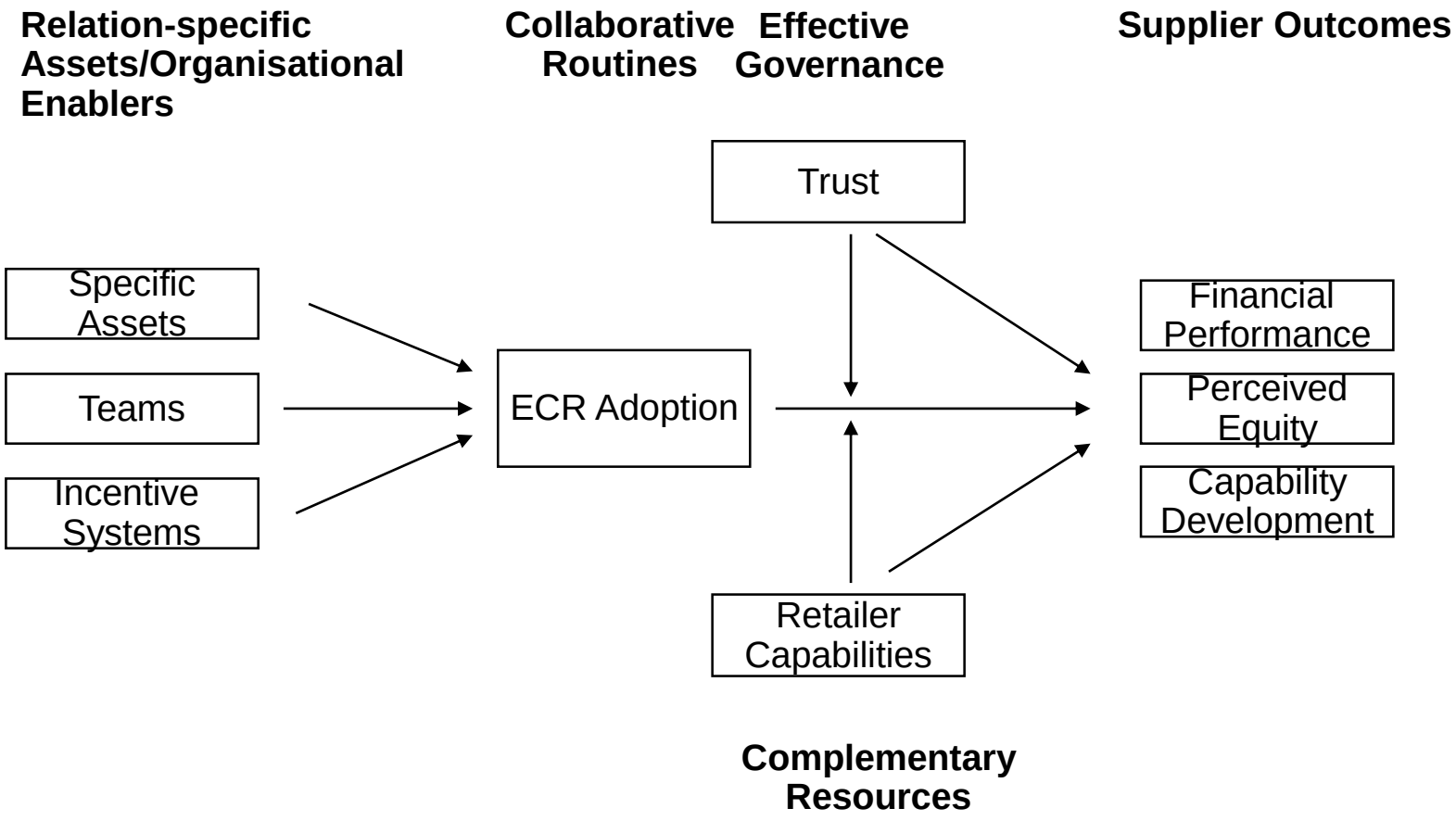
When is coordination difficult?

- When recourses are numerous
- When partners are weighting values differently (economy, social and environmental)
- When collaboration involves high dependency of the parties
- When solutions call for combining coordination mechanisms
- When managers lack of a value chain understanding

Case	Total players	Leadership	Coordination mechanism	Industry	OR method	Stable equilibrium	Put into practice?
1	8	3PL	3	Wood supply	LP	Yes – but not when implemented	Yes – by three players
2	4	Producer	2	Furniture	Heuristic	Yes – with cost allocation	Waiting
3	2	Producer	1	Paper	MILP	No – need incentives	Yes – CR

3PL, third-party logistic; CR, continuous replenishment; LP, linear programming; MILP, mixed integer linear programs; OR, operational research.

A Model of ECR-Adoption and Research Hypotheses



Corsten & Kumar JM 2005

Effects of ECR-Collaboration, Trust and Complementary Capabilities on Performance

	Eco-Perf.	Capa. Develop.	Perceived (In-)Equity
ECR-Collaboration	+	+	-
Trust	+	+	+
Complementary Capabilities	+	+	+
(n = 266 Suppliers)	R^2=.267	R^2=.234	R^2=.557

Corsten & Kumar JM (2005)

It’s a hard space to crack but I think 2015 will be the year we see some big things happen in collaborative logistics, especially shipping.

Rachel Botsman, Author: Collaborative Consumption

A New Generation of Shoppers believe in Sharing

SHIPPING & LOGISTICS

HOW CROWDSHIPPING WORKS

I NEI

COLLABORATIVE LOGISTICS SNAPSHOT

LOCAL DELIVERY

Connects individuals and businesses with a network of delivery agents who locally deliver door-to-door

Bringbee
Clickshipit
Deliv
Expediezentrevous
Kanga
MeeMeep
MyWays (DHL)
Naldo
PickApp
Postmates
Rideship
Sendle
UberRush
Volo
Zipments

Food & Grocery Focused

DoorDelivery
Doordash
Instacart
Bimea
Suppertime
WunWun

TRAVELERS

Connects people who want to get or ship something with travelers.

Backpack
Bistip
BonCarry
Cabenamala
DealTrotter
Entrusters
FriendShippr
Jib.li
Jwebi
Manyship
mmMule
Muber
Packmule.it
PiggyBee
Pleasebringme
SpaceHitch
Shipizy
SocioTransit
TinyCarrier
Zaagel

LONG DISTANCE

Connects businesses with a network of delivery agents.

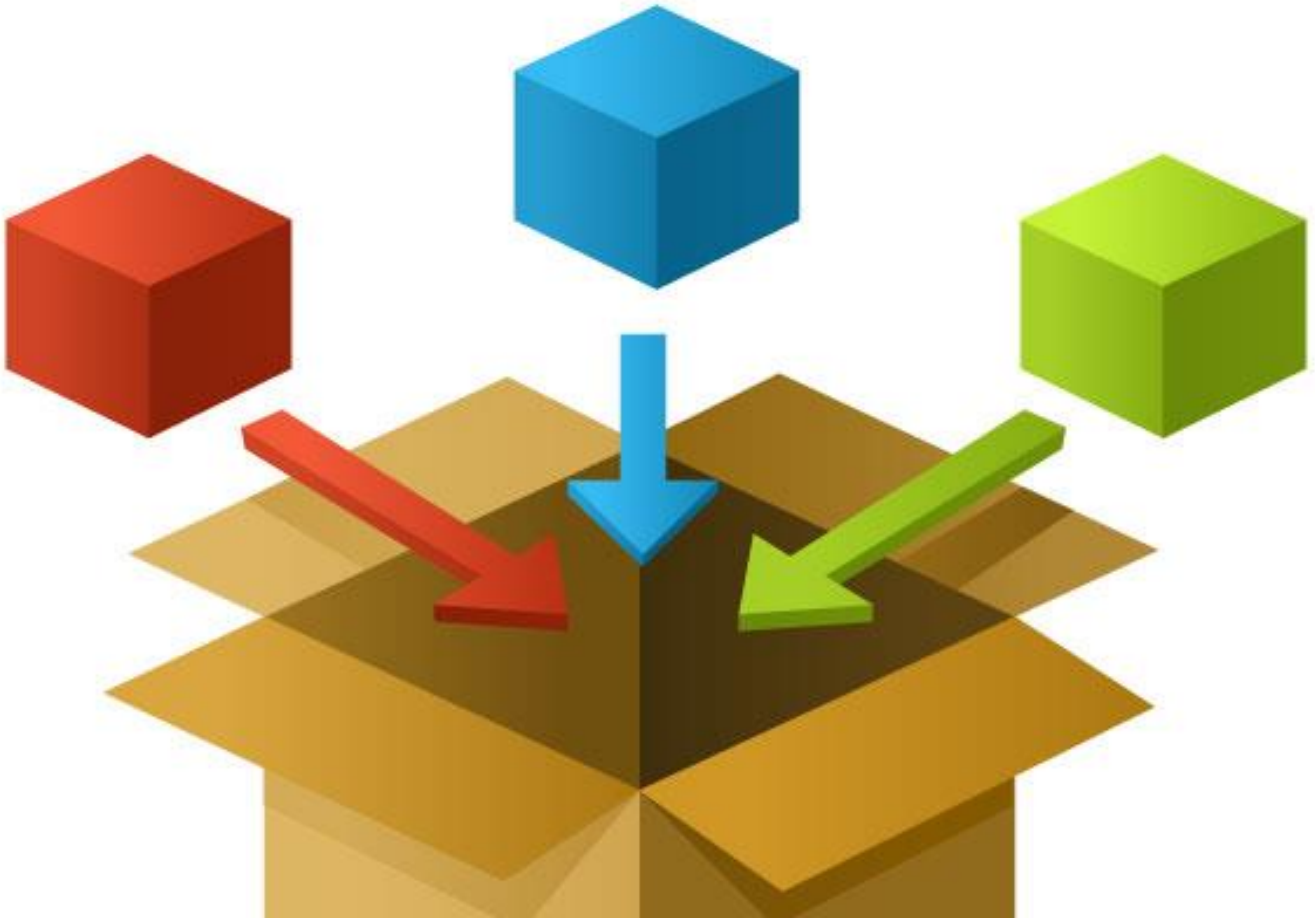
Barnacle
Cargomatic
MeeMeep
Nimber
Parcelio
Picknpass
Rideship
Shyp
Shipeer

MOVING

Connects individuals wi
a network of movers.

GetBellhops
Ghostruck

COLLABORATIVE LAB / RACHEL BOTSMAN 2014



Thank you!

daniel.corsten@ie.edu